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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,480	09/27/2001	Kaoru Awaka	TI-33253 (032350.B345)	8718
23494	7590	08/30/2004	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			DO, CHAT C	
			ART UNIT	PAPER NUMBER
			2124	

DATE MAILED: 08/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/963,480

Applicant(s)

AWAKA ET AL.

Examiner

Chat C. Do

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 9/27/01; 11/02/01; 01/02/02.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1,2,4-6,9-11,13-15 and 18-20 is/are rejected.  
7) ☒ Claim(s) 3,7,8,12,16 and 17 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 27 September 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitations cited in claims 3, 7-8, 12, and 16-17 must be shown or the feature(s) canceled from the claim(s), in particular the critical and non-critical paths along with timing in order to clarify the invention. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

2. Claim 8 is objected to because of the following informalities: claim 8 should depend on claim 3 because claim 8 discloses the critical path and time, which only discloses in claim 3.

Therefore, the examiner considers claim 8 depends on claim 3.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, 4-6, 9-11, 13-15, and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hansen et al. (U.S. Pub. No. US 2003/0110197A1).

Re claim 1, Hansen et al. disclose in Figure 2 a multiply-accumulate module (Figure 2 with 212 as ACC) comprising: a multiply-accumulate core (Figure 2), wherein multiply-accumulate core comprises: a plurality of Booth encoder cells (Figure 3 and page 3 right column paragraph 0043), a plurality of Booth decoder cells connected to at least one of Booth encoder cells (201 in Figure 2); and a plurality of Wallace tree cells connected to at least one of Booth decoder cells (page 5 right column paragraph 0059),

wherein at least one first Wallace tree cell or at least one first Booth decoder cell comprises a first plurality of transistors (transistors in logic gates in Figure 5 for generating PP or partial products), and at least one second Wallace tree cell (page 5 right column paragraph 0059), or at least one second Booth decoder cell comprises a second plurality of transistors (transistors in logic gates in Figure 5 for generating PP or partial products), wherein at least one critical path of multiply-accumulate module comprises at least one first cell and a width of at least one of first plurality of transistors is greater than a width of at least one of second plurality of transistors (e.g. width of transistors are not fixed dependent on its functionality).

Re claim 2, Hansen et al. further disclose in Figure 2 some none of critical paths of multiply-accumulate module comprises at least one-second cell (Figure 4).

Re claim 4, Hansen et al. further disclose in Figure 2 at least one first cell comprises first Wallace tree cell, at least one second cell comprises second Wallace tree cell (page 5 right column paragraph 0059), at least one first cell is connected to and powered by a first power supply, and at least one second cell is connected to and powered by first power supply (e.g. each set of transistors is powered by a common power supply as  $\pm V_{cc}$ ).

Re claim 5, Hansen et al. further disclose in Figure 2 at least one first cell comprises first Booth decoder cell, at least one second cell comprises second Booth decoder cell (page 5 right column paragraph 0059), at least one first cell is connected to and powered by a first power supply, and at least one second cell is connected to and

powered by first power supply (e.g. each set of transistors is powered by a common power supply as  $\pm V_{cc}$ ).

Re claim 6, Hansen et al. further disclose in Figure 2 at least one first Wallace tree cell and at least one first Booth decoder cell comprise first plurality of transistors, and at least one second Wallace tree cell and at least one second Booth decoder cell comprise second plurality of transistors (paragraph 0043).

Re claim 9, Hansen et al. further disclose in Figure 2 at least one-second cell is a most significant bit or a least significant bit and at least one first cell is not a most significant bit or a least significant bit (Figure 3).

Re claim 10, it is a multiplier including a multiply-accumulate module as cited in claim 1. Thus, claim 10 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 11, it is a multiplier including a multiply-accumulate module as cited in claim 2. Thus, claim 11 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 13, it is a multiplier including a multiply-accumulate module as cited in claim 4. Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 14, it is a multiplier including a multiply-accumulate module as cited in claim 5. Thus, claim 14 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 15, it is a multiplier including a multiply-accumulate module as cited in claim 6. Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 18, it is a multiplier including a multiply-accumulate module as cited in claim 9. Thus, claim 18 is also rejected under the same rationale as cited in the rejection of rejected claim 9.

Re claim 19, it is a method claim of claim 1. Thus, claim 19 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 20, it is a method claim of claim 10. Thus, claim 20 is also rejected under the same rationale as cited in the rejection of rejected claim 10.

#### ***Allowable Subject Matter***

5. Claims 3, 7-8, 12, and 16-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. U.S. Patent No. 6,535,902 to Goto discloses a multiplier circuit for reducing the number of necessary elements without sacrificing high speed capability.



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b. U.S. Patent No. 4,628,472 to Fensch discloses a binary multiplier using ternary code.

c. U.S. Patent No. 6,721,774 to Lee et al. disclose a low power multiplier.

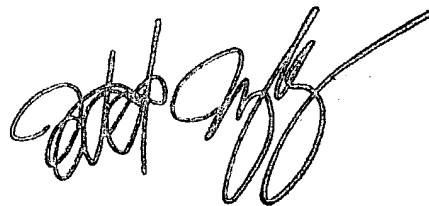
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do  
Examiner  
Art Unit 2124

August 19, 2004



**TODD INGBERG**  
**PRIMARY EXAMINER**